Confined Space Entry

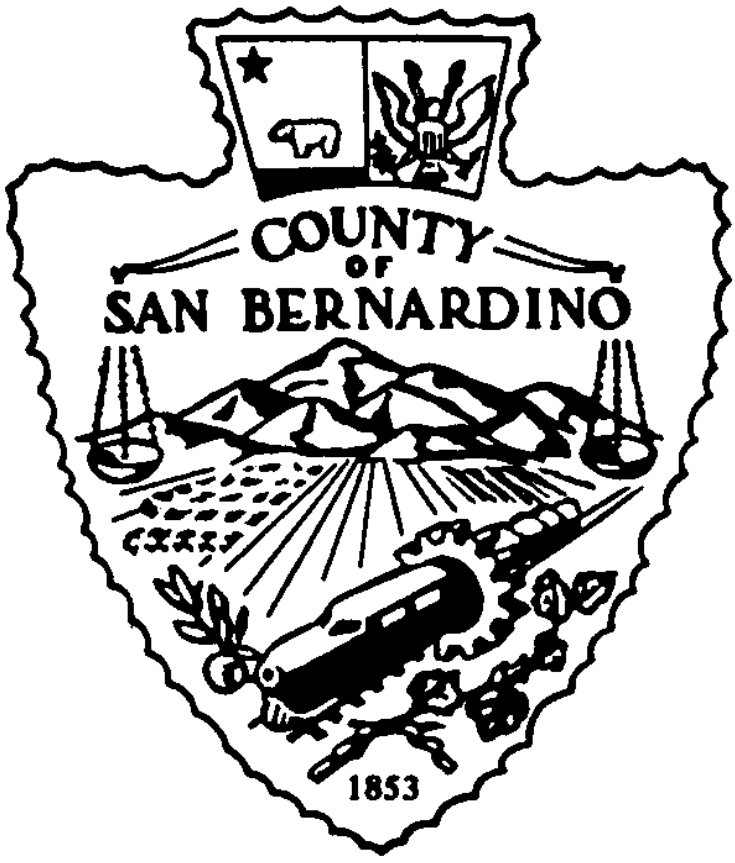

TABLE OF CONTENTS

SUBJECT: CONFINED SPACE ENTRY PROCEDURE	Page

CONFINED SPACE ENTRY PROCEDURE

SCOPE

This section establishes the County of San Bernardino procedure for confined space entry, it provides information and guidance on the process of defining permit entry spaces, and includes forms and formats to be used by County departments in preparing individualized programs. It also and provides procedure to ensure safe entry into confined spaces. The program identifies documentation, communication, and training necessary to ensure the health and safety of County employees. **This procedure sets forth minimum standards for all County departments**. Individual departments may implement more stringent standards. Copies of department-prepared programs are to be provided to Risk Management Division/Safety Section upon request, as well as included in the immediately following divider labeled "Department Program".

PURPOSE

Title 8, California Code of Regulations, General Industry Safety Orders, Article 108 requires employers to establish a written Confined Space Entry Program, including procedures for employee training, emergency reaction and confined space identification.

INTRODUCTION

Confined space entry is a dangerous operation since hazards are not easily detected. Spaces which appear clean, dry, empty and without hazard can be death traps. Confined space accidents are often tragic; they routinely involve multiple fatalities. Confined space accidents, and deaths, are preventable, and it is the intention of San Bernardino County that they be prevented.

It is essential that employees not enter a confined space until the space is properly **tested**, the entering employees are properly **trained** in the potential hazards and safety procedures, and employees are provided with the necessary **equipment**.

This procedure sets forth minimum requirements for safe entry, continued work in, and exit from confined spaces at normal atmospheric pressure for employees of the County of San Bernardino.

DEFINITIONS

Authorized Person. An authorized person is a person approved or assigned by a Department to perform a specified type of duty or to be at a specified location.

Blanking. Blanking is a process to remove a confined space from service and completely protect against the inadvertent presence or release of injurious elements. The following methods are used for blanking: blanking off (skillet type metal blank between flanges), mis-aligning sections of all lines and pipes, a double block and bleed system, electrical lockout of all sources of power, and blocking or disconnecting all mechanical linkages.

Confined Space. A confined space is normally considered an enclosure having limited means of entrance and exit such as, but not limited to: (1) storage tanks, tank cars, process vessels, bins, silos, boilers, and other tank-like compartments; (2) open topped spaces such as pits, vaults, and hoppers, (3) septic tanks, sewers, underground utility/pipe-line tunnels, and similar enclosures.

Confined spaces are not designed for continuous employee occupancy, and have either or both of the following characteristics: (1) an actual or potentially hazardous atmosphere or other recognized safety or health hazard; or, (2) the potential for engulfment by particulate matter or liquid.

Double Block and Bleed. Double block and bleed involves isolating a confined space from a pipe inlet by locking closed two in-line valves and by locking open a drain, or bleed, between the two closed valves to the atmosphere.

Entry. Entry is any action resulting in any part of the body breaking the plain of any opening of the confined space and includes any subsequent work activities inside the confined space.

Entry Permit. An entry permit is the Department's written authorization for entry, under established conditions, into a permit entry space, for a stated purpose, during a specified work shift.

Hazardous Atmosphere. an atmosphere presenting a potential for death, disablement, injury, or acute illness from one or more of the following causes:

1. A flammable gas, vapor, or mist in excess of 10% of its lower explosive limit (LEL);

2. An airborne combustible dust at a concentration that obscures vision at a distance of five feet or less;

3. Less than 19.5% or more than 22.0% oxygen;

4. An atmospheric concentration of any toxic, corrosive, or asphyxiant substance listed in Title 8, California Code of Regulations, General Industry Safety Orders, above the listed numerical value of the permissible exposure limit (PEL) that can reasonably be expected to be present.

5. An atmospheric concentration above the numerical limit indicated on an elements' Material Safety Data Sheet, or that is otherwise known by the employer to present a safety or acute health hazard; or

6. Any condition immediately dangerous to life or health.

Hot Work Permit. A hot work permit is written authorization to perform riveting, welding, thermal or oxygen cutting, heating or other fire or spark producing operations.

Immediately Dangerous to Life or Health (IDLH). IDLH includes any condition posing an immediate threat to life, or likely to result in acute or immediate severe health effects.

LEL (Lower Explosive Limit) and UEL (Upper Explosive Limit). LEL and UEL mean, respectively, the lower and upper concentration of an ignitable gas or vapor in air (usually expressed in percent by volume at sea level), which will burn if an ignition source is present.

Non-Permit Entry Space. A non-permit entry space is a confined space which the Department has determined contains no hazard and therefore requires no permit for entry.

Oxygen Enriched Atmosphere. An oxygen enriched atmosphere is one which contains more that 22% oxygen by volume.

Oxygen Deficient Atmosphere. An oxygen deficient atmosphere is one which contains less than 19.5% oxygen by volume.

Permissible Exposure Limit (PEL). The permissible exposure limit is the limit for an airborne contaminant as specified in Title 8, California Code of Regulations.

Permit Entry Space. A permit entry space is a confined space for which a department has determined an entry permit is required. Such requirement may be because of a hazardous atmosphere, or other safety or health hazard exposure presented by mechanical, electrical, physical or chemical agents which are, or are reasonably expected to be present.

Potential Flammable Hazard. A potential flammable hazard is any atmosphere containing a flammable gas, vapor or solid (dust) at more than 10% of its lower explosive limit.

Qualified Person. A qualified person is one who, by reason of training, experience, and/or designation is familiar with an operation to be performed and the hazards involved.

Rescue Team. A rescue team is that group of employees designated and trained to perform rescues from confined spaces.

GENERAL REQUIREMENTS

Inspection and Evaluation. Each Department shall evaluate all confined space that

employees may be required to enter by identifying and evaluating the hazards and potential hazards of that space based upon:

1. The physical characteristics of the confined space;

2. The current and past uses of the confined space which may have left a residue or material that might fall on, engulf, or otherwise injure or expose an employee;

3. Special hazards arising from the location of the space (e.g., relative to other operations, processes or structures) which may endanger the occupant or occupants of the space;

4. Any operations or processes that are to be carried out in, or which involve, the confined space while employees are inside.

Permit Entry Spaces. Any confined space found to meet the criteria of a permit entry space shall be so classified.

Non-Permit Entry Spaces. Those spaces classified as non-permit entry spaces shall be reassessed whenever conditions previously evaluated have changed.

As an addendum to this procedure, each affected County department shall develop a list of confined spaces in its area of responsibility. Such list will include a classification of each space as to being either a permit or non-permit space. A copy of this list shall be included under the department program section label immediately following. A copy shall also be provided to Risk Management Division, Human Resources upon request.

GENERAL REQUIREMENTS FOR NON-PERMIT ENTRY SPACES

Each Department shall ensure that unauthorized or untrained persons do not enter non-permit entry spaces.

Each Department shall provide specific training to employees before they may be authorized to enter non-permit entry spaces. Training will cover safety and health aspects of work to be performed. Such training shall include use of any personal protective equipment or rescue equipment which the employee may be expected to use. Refresher training will be conducted **at least annually**. All training is to be documented. This documentation shall be kept in the department program section of this manual.

Each department shall ensure availability and use of personal protective equipment, in accordance with Article 108, Title 8, California Code of Regulations (CCR).

In all cases, atmosphere in a confined space shall be tested before any employee makes an initial entry into the space, using a direct reading instrument with a remote sampling technique. The results of tests shall be kept at the worksite for the duration of the work. Affected employees shall be afforded an opportunity to review and record testing results. The following shall be evaluated:

1. Oxygen level, 19.5% to 22% by volume.

2. The percent of the LEL reached; and

3. An indication of toxic material known or suspected to be present.

An employee shall not enter a non-permit confined space if any of the following conditions exist:

1. An oxygen deficient (less than 19.5% by volume) or enriched (more than 22.0% by volume) atmosphere is present.

2. There is a potential flammable hazard. See Definition, page 74.

3. There is an indication of the presence of a toxic material at or above PEL, as determined by testing.

4. Testing shall be conducted with sufficient frequency to ensure that development of dangerous air does not occur during performance of work in the space.

Mechanical ventilation may be used to meet entry requirements set forth above. Such equipment is intended to facilitate entry into

spaces which characteristically have a normal atmosphere and are simply "stale" due to long periods of being closed up.

In ventilating underground structures forced draft is usually superior to suction draft. Blowing creates turbulence and scours out all areas, including the corners.

Spaces in which the presence of a hazardous atmosphere is a normal state due to intrusion from gases, vapors, or toxic materials are not to be regarded as non-permit spaces and must not be categorized as such.

GENERAL REQUIREMENTS FOR PERMIT ENTRY SPACES

Each Department shall ensure that unauthorized or untrained persons do not enter a permit entry space.

Each Department shall provide specific training to employees before they may be authorized to enter permit entry spaces. Training will cover safety and health aspects of work to be performed. Such training shall include use of personal protective equipment or rescue equipment which the employee may be expected to use. Refresher training will be conducted **at least annually**. All training is to be documented.

The Department shall ensure availability, at the entry portal, of required rescue and retrieval equipment.

Requirements for emergency or routine entry into permit entry spaces: (Section 5159, Title 8, (CCR) in part).

1. Wearing of appropriate, approved respiratory equipment (in accordance with Section 5144).

2. An approved safety harness and attached line must be used.

3. At least one employee shall "stand by" on the outside of the confined space and at least one additional employee shall be within sight or call of the "stand by" employee.

    A. The "stand by" employee shall have appropriate approved respiratory protective equipment, **including** an **independent source** of breathing air.

    B. A "stand by" employee may enter the confined space but only in case of emergency and only after the arrival of at least one additional employee outside of the confined space. The intent of a "stand by" employee to enter must be limited to the emergency.

4. When entry must be made through a top opening, the following shall also apply:

    A. The safety harness shall be of the type that suspends a person in an upright position.

    B. A hoisting device shall be provided for lifting employees out of the space.

5. At least 1 person trained in First Aid and CPR shall be immediately available whenever respiratory equipment must be worn.

6. An effective means of communication must be available between the employee(s) inside the confined space and the "stand by" employee(s).

ENTRY PERMIT SYSTEM

The entry permit, which is part of the entry procedure, shall authorize entry by only the named employees, into a specified confined space, on a specified day, and during a particular shift. The entry permit shall specify by name the employee among entrants who is in charge of the entry. This individual must confirm that all required pre-entry requirements are met. The completed entry permit shall be at the job site and is to be read, understood, and **initialed** by all employees involved **before any entry is made**. A sample entry permit is enclosed in this procedure as page 79. The entry permit must include:

1. A statement or description of the hazards known or expected to be present in the confined space due to its current or past use, and any cleaning, purging or inerting done prior to entry.

2. A description or statement of any additional hazards that may be generated as a result of activities carried out during occupancy of the space.

3. A specification of the minimum acceptable environmental and physical conditions for initial entry and for occupancy of the confined space.

4. Specification of all control measures that must be taken prior to entry. These measures may include, but are not limited to:

   A. Procedures for isolating the space by lockout/tagout of the power sources, valves or mechanical power transmission equipment; blanking, double block and bleed, or misalignment or removal of sections of pipes, ducts or lines;

   B. Any flushing, purging, or cleaning which can be done without entry into the space;

   C. Mechanical ventilation of the space, including the capacity of blowers and how long they must run before entry;

   D. Specifications for the manner of making the space inert if such measures are to be used.

5. A statement of the type of personal protective equipment, including respirator protection, protective clothing, and rescue equipment, etc., that will be required for entry.

6. Specifications for the atmospheric testing to be done immediately prior to entry. This includes testing for oxygen level, flammable gases, vapors or solids, and/or airborne toxic materials. It shall also specify the individual responsible for performing the test, and what the maximum or minimum values for entry shall be. Test results shall be maintained at the job site.

7. The name of the employee designated to perform either continuous atmospheric monitoring or periodic testing. The frequency and nature of testing while employees occupy the confined space.

8. The authorization for hot work, either as part of entry permit, or by a separate hot work permit. If a separate hot work permit is issued, the employee in charge of the entry must be fully aware of the hot work permit requirements outlined in Sections 5158 and 5159, Title 8, CCR.

9. A statement of the types of retrieval equipment required for rescue purposes that must be available at the time of entry.

10. The name of the stand-by attendant(s).

11. Rescue equipment, standby personnel, and rescue methods shall be in accordance with requirements in Section 5159, Title 8, CCR.

ADDITIONAL REQUIREMENTS

Regardless of the ventilation system used, additional precautions shall be taken when any of the following conditions exist in the confined space:

1. An oxygen level less than 19.5%, at the time of entry or during occupancy.

2. A LEL greater than 10% at the time of entry (the PEL must not be exceeded), or during occupancy.

3. Exposure at or above the PEL, at the time of entry or during occupancy.

4. There are electrical, mechanical, or other physical hazards which require proper lockout procedures be followed.

5. It is necessary to isolate the confined space from the entry of potential hazardous materials.

6. Hot work is to be performed in the space.

7. In the opinion of the qualified person additional precautions are needed.

All such entries are considered permit entries. A qualified person is to determine exactly how entry shall be made in accordance with the preceding requirements. When the conditions of 1 or 2 immediately above are met, or an "immediately dangerous to life or health" (IDLH) condition exists, workers shall use a pressure demand atmosphere supplying respirator. If an airline system is used in an IDHL environment, it must have an auxiliary air supply to protect against potential failure of primary supply. In addition:

A. Rescue procedures and equipment adequate to effect removal shall be in place before entry is made.

B. An outside attendant shall maintain contact with workers in the confined space and have capability to immediately summon additional aid. An attendant shall not enter a confined space to begin rescue until additional help has been summoned and is on site.

IN-HOUSE RESCUE TEAM REQUIREMENTS

Each Department shall provide an in-house rescue team in permitted entry areas. The Department shall provide training including hands-on practice using all rescue, retrieval, and personal protective equipment that would be required in confined space rescue. This practice shall be documented at least annually and kept in the department program section of this manual.

Pressure demand atmosphere supplying respirators shall be provided and used by all rescue personnel who are expected to make entry into a confined space under emergency conditions.

A rescue team shall be present at locations where confined spaces have been determined to be "permit" spaces. The person in charge of entry shall verify that this team is present before entry is begun.

At least annually, the Department shall provide training to rescue team members in duties they are expected to perform.

At least one person trained in First Aid and CPR must be immediately available whenever respirator protection is required for entry into a confined space.

CONTRACTORS

Each Department shall inform all contractors performing work in a confined space, or their representatives, of any potential fire, explosion, health or other safety hazards of the confined space, and of any current or past history of the space that might cause such hazards.

The Department shall inform contractors or their representatives of the applicable safety rules of the facility, including those portions of the emergency action plan applicable to the contractors' employees.

Contractors shall be required to prepare and implement written confined space entry procedures that meet all standards contained herein.

CONFINED SPACE ENTRY PERMIT

JOB DESCRIPTION: _____

_____

LOCATION: _____

DATE: _____ TIME ISSUED: _____ TIME EXPIRES: _____

Attendant: _____ _____ _____

Entrants: _____ _____ _____

Rescue Team _____ _____ _____

HAVE THE FOLLOWING PRECAUTIONS BEEN TAKEN?	CHECK Yes	No	NA
Hazards, testing and emergency procedures explained:	___	___	___
Gas lines isolated?	___	___	___
All valves locked and capped?	___	___	___
Electrical switches locked and tested before entry?	___	___	___
Hot work permit obtained?	___	___	___
Purging or ventilation required?	___	___	___
Lifelines and safety belts for those entering?	___	___	___
Rescue equipment on site?	___	___	___

AIR SAMPLING EQUIPMENT USED:	Type	Serial No.	Date Calibrated	By Whom
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____

TESTS CONDUCTED	Danger Level:	Time	Results	Time	Results
0_2 Deficiency	(less than 19.5%)	_____	_____	_____	_____
Flammability	(more than 10%)	_____	_____	_____	_____
Toxicity	Chemical dependent	_____	_____	_____	_____

LIST PROTECTIVE EQUIPMENT TO BE USED: _____

_____

_____

_____ _____

Supervisor Manager

safety/docs/sftymnl/master/confined space.doc